

Featured Articles

O&M Cloud Service for Expediting Business Innovation

Junichi Sato
Takeo Shirai
Hideyuki Sakai
Takao Baba

OVERVIEW: There is growing demand from a variety of industries for O&M services that can make the operation and maintenance of equipment and machinery more efficient, and there are strong global trends associated with the expectation that this will become a key concept behind a new industrial revolution. Hitachi supplies the Global e-Service on TWX-21 cloud service, which draws on the experience and know-how in equipment life cycle management that it has established through its global business operations over many years. Hitachi is contributing to the new industrial revolution by delivering benefits to manufacturers in the form of increased product sales, improved productivity, and higher income from after-sales services.

INTRODUCTION

THERE has been growing international demand from a variety of industries in recent years for services that improve the efficiency of the operation and maintenance (O&M) of equipment and machinery.

General Electric Company (GE) has coined the term “Industrial Internet” for the service concept of improving productivity by offering cloud-based functions for the collection and analysis of data from equipment and machinery⁽¹⁾. Similarly, the German government has adopted the term “Industrie 4.0” for a technology strategy that uses information and telecommunications technology to improve factory productivity while also reducing energy consumption and improving the work-life balance of workers⁽²⁾. Both of these concepts incorporate the strong hope that O&M services will bring about a new industrial revolution, and so there is increasing global activity in the research, development, and commercialization of the control, information, telecommunications, and other technologies that are key to O&M services.

Against the background of these global trends, Hitachi supplies O&M services that match the diverse needs of customers through its Intelligent Operations suite of products, services, and consulting that incorporates its advanced information and telecommunications technologies and practical know-how. Manufacturing is one of the industries to which this diverse collection of customers belong and is characterized by having products that are covered by after-sales services, and that are spread around the world. The wide range of equipment and machinery

used by the industry, together with other factors such as its diversity of workplaces, mean that experience and know-how in particular are needed for their management. In response, Hitachi supplies Intelligent Operations for Manufacturing as a way of directly linking product users, the places where products are used, production lines, and development centers.

This article gives an overview of a cloud service for the equipment life cycle, one of the services of Intelligent Operations for Manufacturing, describing its business benefits, features, and examples of its use.

OVERVIEW OF CLOUD SERVICE FOR EQUIPMENT LIFE CYCLE

Along with the practical experience and know-how of equipment life cycles it has built up over a decade of business operations, Hitachi has also been identifying and enhancing new business values that arise out of maintenance services. These new business values cover, (1) increasing product sales, (2) improving productivity, and (3) higher income from after-sales services. Achieving these constitutes business innovation for the manufacturing industry.

Global e-Service on TWX-21* is an O&M cloud service for the equipment life cycle that is supplied by Hitachi against this background in order to expedite business innovation in manufacturing (see Fig. 1). The service has been adapted from the Global e-Service equipment life cycle management system of Hitachi Construction Machinery Co., Ltd., which has a long

* TWX-21 is a trademark of Hitachi, Ltd.

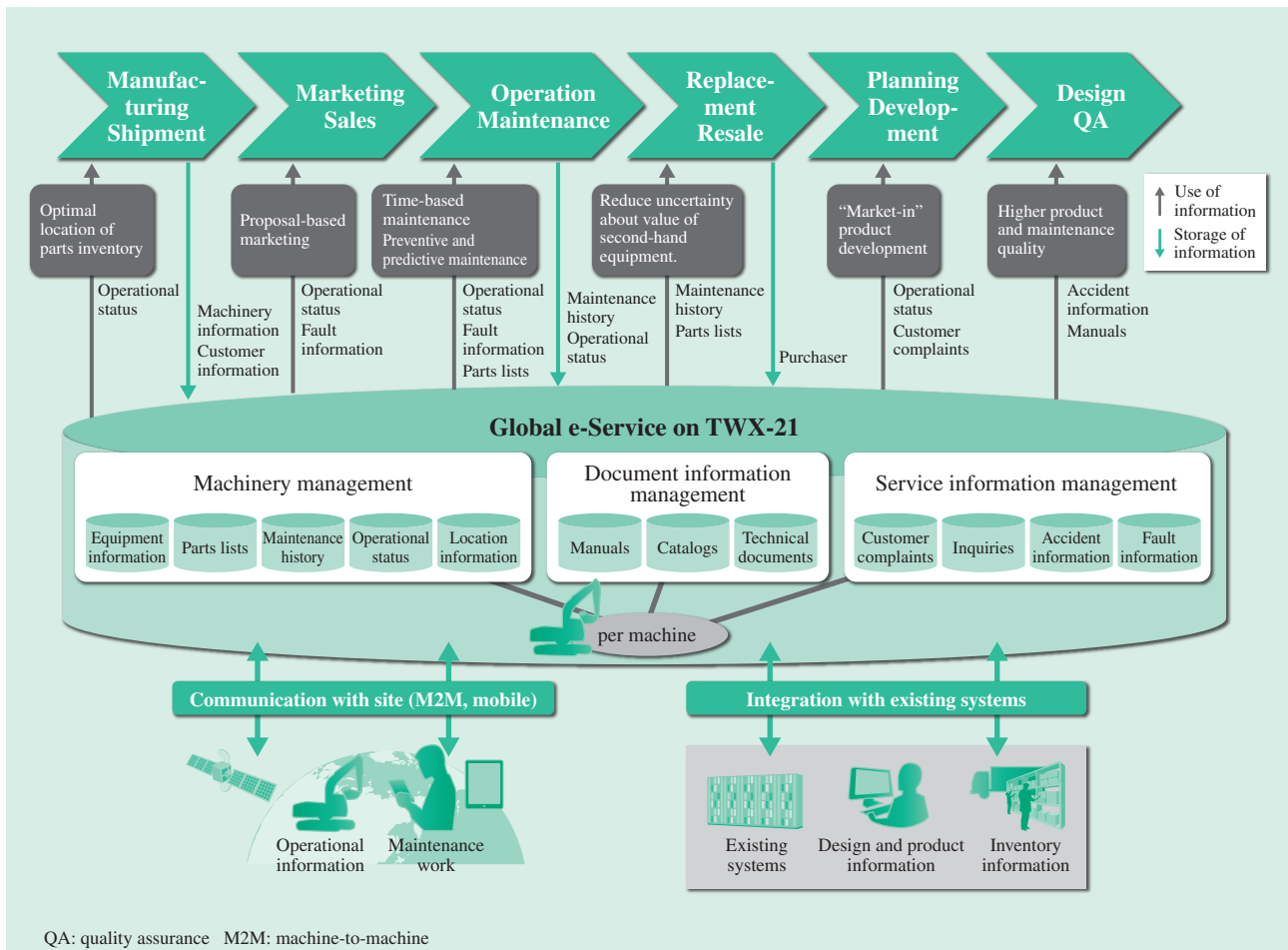


Fig. 1—Overview of Global e-Service on TWX-21 Equipment Life Cycle Cloud Service.

Global e-Service on TWX-21 delivers business benefits across the entire equipment life cycle, contributing to increased product sales, productivity improvement, and higher income from after-sales services.

experience of operating in the global market. It has been made more general-purpose so that it can be used in other industries, being particularly suited to businesses that handle a large number of products that are distributed globally through agents.

Global e-Service on TWX-21 comprises a diverse collection of business functions based on experience and know-how built up through global business operations. Using these functions, manufacturers can adopt best practices for equipment life cycle management in the form of templates. By supplying equipment life cycle management functions that are proven in use throughout the world in the form of a cloud service, Global e-Service on TWX-21 is contributing to business innovation in manufacturing, and also to bringing about a new industrial revolution.

The following sections describe the business benefits of Global e-Service on TWX-21 that contribute to realizing the value delivered by O&M cloud services, and the features that underpin these.

Realizing Value Delivered by O&M Cloud Services

This section describes the business benefits of the Global e-Service on TWX-21 that contribute to the three values from the O&M service described above based on the utilization in each business phase of the information collected across the life cycle, starting from equipment manufacturing and shipment.

(1) Increase product sales

The service helps increase product sales in both the planning and development and the marketing and sales phases of the equipment life cycle.

It makes it possible to adopt a “market in” approach to product development that takes market needs into account during the planning and development phases by analyzing information about customer complaints and other operational data categorized by product and location. In the marketing and sales phases, it implements a timely proposal-based style of marketing that wins a high proportion of orders by viewing

operational data and records of repairs and faults for each machine.

(2) Improve productivity

The service helps improve productivity in both the design and quality assurance (QA) and the operation and maintenance phases of the equipment life cycle.

It improves product and maintenance quality in the design and QA phases by sharing incident data, response details, electronic manuals, and other information categorized by product so as to prevent similar problems and shorten the recovery time. In the operation and maintenance phases, it speeds up the handling of customer complaints and other inquiries by sharing information about customer complaints, electronic manuals, and other information categorized by product.

(3) Higher income from after-sales services

The service helps increase income from after-sales services during both the manufacturing and shipment and the operation and maintenance phases of the equipment life cycle, and subsequently in the replacement and resale phases.

In the manufacturing and shipment phases, analysis of operational data categorized by product and location can indicate where best to maintain parts inventory. In the operation and maintenance phases, the viewing of operational data, records of repairs and faults, and parts lists for each machine can be used to implement predictive maintenance practices to prevent failures before they happen. These include time-based maintenance, whereby the replacement of parts is determined based on operating time, and condition-based maintenance, whereby the replacement of parts is based on their condition when inspected. In the replacement and resale phases, by including maintenance history and parts lists along with other information provided with second-hand machines, these can be re-sold at a higher price by reducing uncertainty about their value.

Solution for Enhancing O&M Cloud Service

Global operations for manufacturing require enhancements to equipment life cycle management. This section describes the Global e-Service on TWX-21 solution for these needs.

(1) Realtime operation monitoring

Whereas the operational data utilized in each phase of equipment life cycle management has conventionally been gathered during on-site maintenance, global operations result in equipment being spread out around the world and this makes it

difficult to collect accurate information. In response, Global e-Service on TWX-21 provides realtime operation monitoring, using machine-to-machine (M2M) functions for the automatic remote collection of information on equipment operation. This reduces the amount of on-site maintenance and helps in performing anomaly detection, as envisaged by the Industrial Internet concept.

(2) Secure, high-speed sharing of electronic documents worldwide

While the common practice for sharing of electronic documents in the past has been to send them as e-mail attachments, global business operations hinder productivity due to unstable network environment and bring an increased risk of information leaks due to poor staff morale. In response, Global e-Service on TWX-21 provides secure, high-speed sharing of electronic documents throughout the world using fast and reliable Internet communications based on multi-route communication technology, and electronic document stores with such security functions as download restrictions and version control. This helps establish the information-sharing platform required for an O&M cloud service that can be used globally.

Features Underpinning O&M Cloud Service

Operational and other business issues need to be resolved in order to implement global equipment life cycle management. This section describes the features of Global e-Service on TWX-21 that help achieve this.

(1) Integration of different data sources linked to equipment

While it is desirable to use all of the functions provided by Global e-Service on TWX-21 to implement equipment life cycle management, there are also cases when a company will already have its own business systems for the equipment life cycle.

Storing the same information across a number of different business systems not only increases workloads, it also increases the number of data entry errors. Since Global e-Service on TWX-21 is a cloud service with functions that can also be supplied individually, this problem can be overcome by exchanging data with existing systems. This integration links the equipment life cycle data managed by each system to specific machines so that groups of data can be viewed together using a particular machine as the key, while also ensuring that the customer's existing systems can remain in use.

In the operation and maintenance phases, for example, this contributes to higher income from

after-sales services by allowing consolidated use of information such as the operating status or maintenance history of the equipment concerned.

(2) Appropriate access control based on complex distribution channels

The global distribution channels used in manufacturing require the sharing of information across a large and diverse range of stakeholders, for example, it is not uncommon for headquarters and local agencies to be operated by different companies that are based in different countries. In response, Global e-Service on TWX-21 can facilitate the sharing of information across company and national boundaries and provide secure control of information release for each task associated with a particular product category by not only linking these companies by product category, but also providing multilingual support for each business function.

In the operation and maintenance phases, for example, this can improve productivity by ensuring a rapid response to inquiries from stakeholders around the world.

(3) Hierarchical delegation of authority

Since the global distribution channels used by manufacturers involve large numbers of stakeholders spread across different countries and companies, ranging from headquarters to local agencies located around the world and including domestic business divisions and overseas subsidiaries, it is difficult for managers at headquarters to keep up with what is happening to all stakeholders and manage their work appropriately. In response, Global e-Service on TWX-21 can reduce the workload for managers at headquarters by delegating managerial authority over business functions to the managers of subordinate stakeholders. It can also collect, store, and utilize information at a detailed level, particularly regarding small overseas operations, through the appropriate delegation of authority based on conditions at the local site.

In the marketing and sales phases, for example, this can help increase product sales by creating an environment in which the information required for local sales activities can be acquired and utilized in a proportionate manner.

EXAMPLE APPLICATIONS AND BENEFITS

Global e-Service on TWX-21 has been adopted in manufacturing applications outside the construction machinery industry. This section describes improvement techniques used in the design and

development phases by a particular manufacturer to ensure that product development reflects local needs in terms of the challenges associated with establishing a working environment to accompany global deployment.

This particular manufacturer identified a need for information sharing practices between engineers at local and overseas development centers that would allow the exchange of information about both common functions and functions specific to particular regions or customers, and also relevant background information, and that would also permit consultation with experts based on experience of similar work undertaken in the past.

However, foreign customs need to be taken into account when establishing such a global working environment. In Japan, for example, design and development work is subject to rigorous QA, with the tasks associated with equipment life cycles being undertaken in accordance with formalized workflows. Europe and America, in contrast, have a culture of working without QA, accompanied by the frank sharing of information between sales and the workplace, making the global deployment of Japanese working environments difficult.

While Global e-Service on TWX-21 provides work information management functions that utilize the formalized workflows familiar to Japanese manufacturers, it also takes account of the requirements of other countries and, in a new initiative, has utilized the social networking service (SNS) platform of salesforce.com, inc. to build a business SNS that provides a forum for discussion and information sharing that transcends organization, time, and place (see Fig. 2). Hitachi has added an “article function” to the SNS platform that collects comments on each topic, integrating these with the global electronic document store to provide an SNS suitable for use in business that can be used as a communication tool to augment meetings, e-mail, or other exchanges. Moreover, Hitachi has strengthened security to ensure that exchanges have appropriate scope and content, and has added a multilingual function for building synonym dictionaries to increase the speed of global information sharing.

The benefits of deploying these functions include spreading knowledge and know-how across the organization and allowing a vigorous exchange of views among engineers and other experts working on a particular product, accompanied by their sharing past work via the electronic document store within a secure closed group.

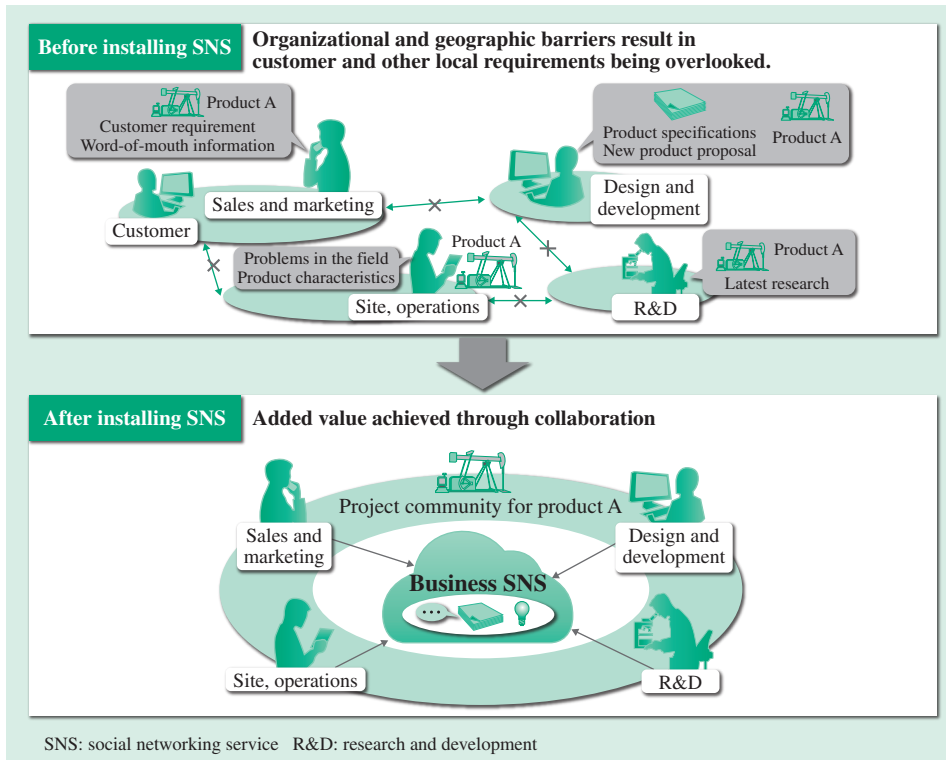


Fig. 2—Overview of Business SNS Use. SNS provides a forum for discussion and information sharing that transcends organization, time, and place to allow the sharing of knowledge and know-how and the vigorous exchange of views.

CONCLUSIONS

This article has given an overview of Global e-Service on TWX-21, a cloud service for the equipment life cycle, describing its business benefits, features, and examples of its use. In the future, Hitachi intends to provide seamless management and utilization of people, things, and events, including through the integration of a business SNS with equipment operational data collected through M2M functions.

Global e-Service on TWX-21 is being developed as an information and telecommunications service for O&M services that seek to bring about a new industrial revolution. As a cloud service with exceptional functional expansion, Hitachi also aims to turn it into an attentive, genuinely useful service by building up experience and know-how through its use by a variety of customers, and growing steadily alongside those customers.

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ABOUT THE AUTHORS



Junichi Sato
 Operation & Maintenance Cloud Services Promotion Department Smart Business, Smart Information Systems Division, Information & Telecommunication Systems Company, Hitachi, Ltd. He is currently engaged in the planning and sales of Global e-Service on TWX-21.



Takeo Shirai
 Operation & Maintenance Cloud Services Promotion Department Smart Business, Smart Information Systems Division, Information & Telecommunication Systems Company, Hitachi, Ltd. He is currently engaged in the development of Global e-Service on TWX-21.



Hideyuki Sakai
 Service Innovation Research Department, Yokohama Research Laboratory, Hitachi, Ltd. He is currently engaged in the research and development of Global e-Service on TWX-21.



Takao Baba
 Business Consulting Division, Hitachi Consulting Co., Ltd. He is currently engaged in the planning and sales of Global e-Service on TWX-21.